Claims:

1. A combustion process comprising:

forming a gas mixture from oxident, fuel, and inert gas; and

combusting said gas mixture in a burner, wherein combusting comprises flameless combustion.

2. The process as claimed in claim 1,

wherein said oxidant comprises substantially pure oxygen or a mixture of substantially pure oxygen and substantially nitrogen-free inert gas; and

wherein said inert gas comprises a substantially nitrogen-free inert gas.

3. The process as claimed in claim 1, wherein the temperature of the gas mixture is above the self-ignition temperature of the gas mixture, and further comprising:

forming an admixture in said burner, before said combusting, of:

oxygen, or a mixture of oxygen and inert gas;

fuel, or a mixture of fuel and inert gas;

or both.

4. The process as claimed in claim 1, wherein the inert gas comprises a mixture of inert gases.

5. The process as claimed [[in one of claims 1 to 4]]in claim 1, wherein, in the gas mixture, the volume ratio of inert gas to fuel and oxygen is greater than 1.5.

6. The method as claimed in claim 1, further comprising:

forming the inert gas from an exhaust gas occurring during combusting of the gas mixture.

7. The method as claimed in claim 6, comprising:

admixing exhaust gas to oxygen, to fuel, or both,

with an internal exhaust gas recirculation system by retaining a part of the exhaust gases in a combustion space of the burner,

with an external exhaust gas recirculation system by extracting a part of the exhaust gases after the burner and recirculating said part of the exhaust gases to before the burner, or

both.

8. The method as claimed in claim 1, wherein forming comprises forming with cryotechnically produced, substantially pure oxygen.

9. The method as claimed in claim 1, wherein forming comprises:

forming with a mixture of substantially pure oxygen and inert gas, including extracting oxygen with an oxygen transport membrane from an oxygen-containing gas mixture arranged on a retentate side of the membrane, and transporting said extracted oxygen to a permeate side of the membrane, and removing said transported oxygen by scavenging with the inert gas.

10. The method as claimed in claim 1, wherein forming the gas mixture comprises mixing the fuel or a mixture of fuel and inert gas at least at two locations in the burner arranged sequentially relative to a through-flow direction of the burner.

11. The method as claimed in claim 1, further comprising:

precombusting a partial quantity of the oxygen and a partial quantity of the fuel to increase the mixture temperature in the burner, to increase the exhaust gas proportion in the gas mixture before a main combustion space, or both, said precombusting being catalytically initiated, stabilized, or both.

12. An installation useful for carrying out a process as claimed in claim 1, comprising:

a mixture forming device configured and arranged for the formation of a substantially nitrogen-free gas mixture of oxidant, fuel, and inert gas, and having a burner configured and arranged for carrying out flameless combustion, the mixture forming device configured and arranged to bring oxygen and fuel together in the burner first to form a gas mixture having a temperature above the self-ignition temperature of said gas mixture.

13. The installation as claimed in claim 12, further comprising:

an exhaust gas recirculation system; and

wherein the inert gas is formed by the exhaust gas resulting during the combustion of the gas mixture.

14. The installation as claimed in claim 13, wherein the burner comprises a combustion space, and wherein the exhaust gas recirculation system comprises:

an internal exhaust gas recirculation system configured and arranged to retain a part of the exhaust gases in the combustion space of the burner;

an external exhaust gas recirculation system configured and arranged to extract a part of the exhaust gases after the burner and to recirculate said extracted part of the exhaust gases to before the burner; or

both.

15. The installation as claimed in claim 14, wherein the internal exhaust gas recirculation system includes a swirler device configured and arranged to swirl a gas flow of oxygen or a mixture of oxygen and exhaust gas before, or at an entry into, a combustion space of the burner.

16. The installation as claimed in claim 14, wherein the internal exhaust gas

recirculation system comprises, in a combustion space of the burner, an exhaust gas guidance device configured and arranged to effect or support a reverse flow of a part of the exhaust gases within the combustion space against the through-flow direction of the burner.

17. The installation as claimed in claim 12, wherein the burner comprises an upstream precombustion space and a downstream main combustion space, and further comprising:

a fuel injection device configured and arranged to introduce fuel both in the burner upstream precombustion space and in the burner downstream main combustion space.

18. The installation as claimed in claim 17, wherein the fuel injection device comprises a lance extending centrally in the burner upstream precombustion space and in the burner downstream main combustion space, and has upstream injection nozzles associated with the burner upstream precombustion space and downstream injection nozzles associated with the burner downstream main combustion space, wherein said burner upstream and downstream injection nozzles are configured and arranged to introduce fuel into the burner upstream precombustion space and into the burner downstream main combustion space, respectively.

19. The installation as claimed in claim 17, further comprising:

a catalyzer arranged in the burner upstream precombustion space, said catalyzer configured and arranged to at least partially burn fuel and oxygen when introduced into the burner upstream precombustion space.

20. The installation as claimed in claim 12, wherein the mixture forming device includes an oxygen separating device with an oxygen transport membrane, the membrane including a retentate side and a permeate side, the membrane configured and arranged to extract oxygen from an oxygen-containing gas mixture when arranged on the retentate

side of the membrane and to transport said oxygen to the permeate side of the membrane, and further comprising:

a scavenging gas comprising exhaust gas positioned to scavenge said transported oxygen.

21. The installation as claimed in claim 12, wherein the burner comprises a combustion space, and wherein the mixture forming device is configured and arranged to introduce substantially pure oxygen into the burner combustion space near a location at which fuel or a mixture of fuel and inert gas is introduced into the combustion space, and further comprising:

an internal exhaust gas recirculation system configured and arranged to retain a part of exhaust gases in the combustion space and to supply the retained exhaust gases as inert gas lacking for the formation of the gas mixture.

22. The process as claimed in claim 1, wherein the combustion process comprises a combustion process for generating electrical current, heat or both.

23. The process as claimed in claim 1, wherein combusting consists essentially of flameless combusting.

24. The process as claimed in claim 5, wherein the volume ratio of inert gas to fuel and oxygen is about 2.5.

25. A system comprising:

a gas turbine installation comprising an installation according to Claim 12.

26. An installation as claimed in claim 16, wherein the exhaust gas guidance device comprises a cross-sectional expansion.

27. An installation as claimed in claim 19, further comprising:
a catalyzing device comprising said catalyzer.

28. An installation as claimed in claim 20, further comprising:
an external exhaust gas recirculation system configured and arranged to deliver said exhaust gas to said membrane.